
CANAL SYSTEM
IN
SPONGES
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Characteristics of Sponges

a) Multicellular

b) Heterotrophic

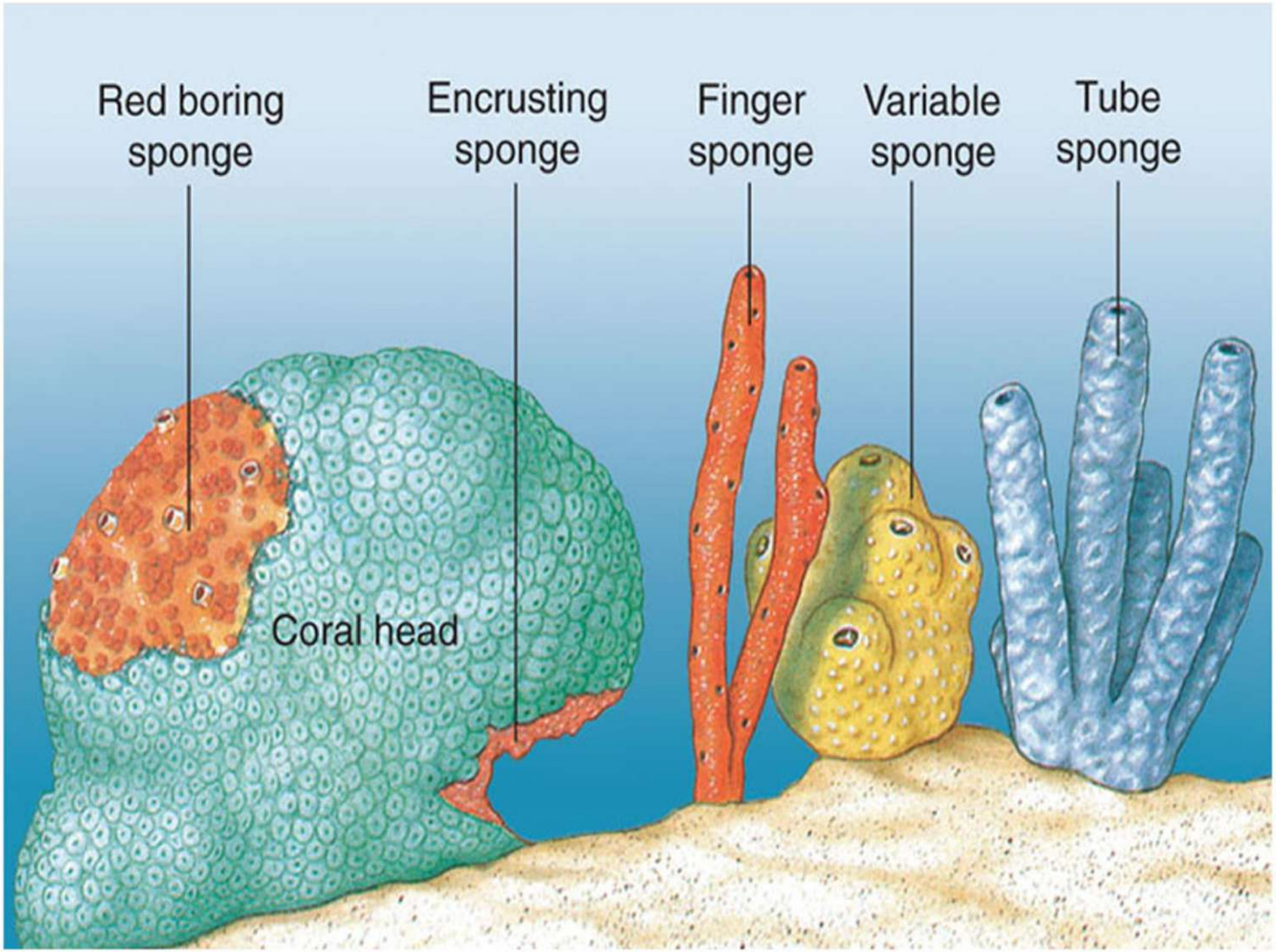
c) No cell Walls

d) Few specialized cells (choanocytes)

e) No germ layers (no gastrulation- no gut)

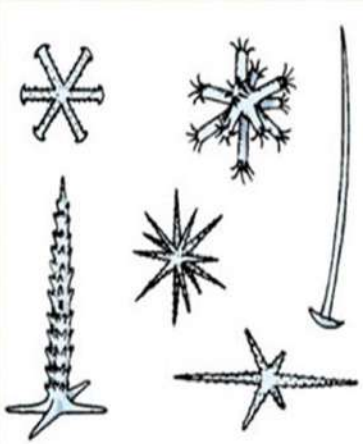
General Features:

- Sessile (immobile) sponges are filter feeders
- Porifera means "pore-bearing"
- Sac-like bodies with many pores
- Use flagellated "collar cells", or *choanocytes*, to move water to help filter/feed
- Body is efficient aquatic filter
- Approximately 15,000 species of sponges
- Most are marine, Few live in brackish water, 150 in fresh water

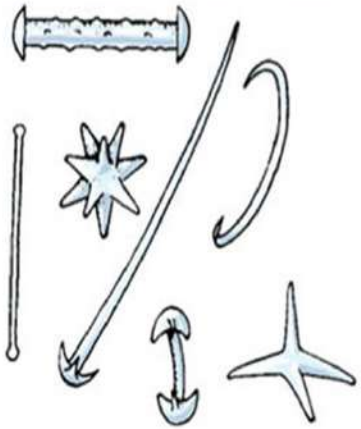

Red boring sponge
Encrusting sponge
Finger sponge
Variable sponge
Tube sponge
Coral head

Skeletal structure of a sponge:

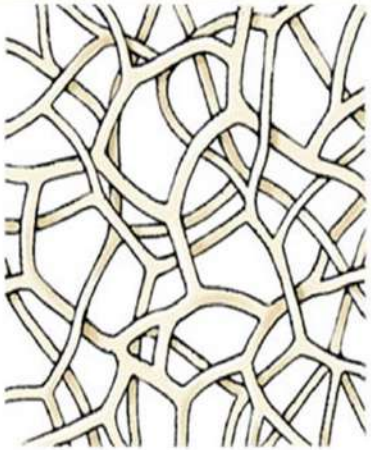
- Skeletal structure of a sponge can be fibrous and rigid
- **Rigid skeleton consists of spicules**
- **Fibrous portion consists of spongin**



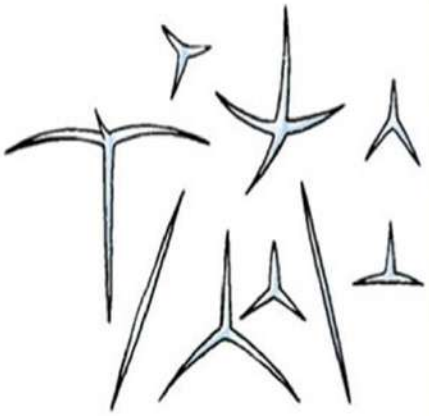
Siliceous spicules (Hexactinellida)



Siliceous spicules (Demospongiae)



Spongin



Calcareous spicules

Canal System

- **Thus canal system is a system of inter communicating cavities bathed by the currents of water "*that aids the sponges to carry out vital life processes like Nutrition , Respiration, Excretion, Reproduction etc.*"**

- **It is found in simplest form in Olynthus, but in others it has attained varied degree of complexity where the collared cells (Choanocytes) are restricted to certain regions.**

Types of Canal Systems

- Three main types of canal systems in the order of increasing complexity

- They are the Following

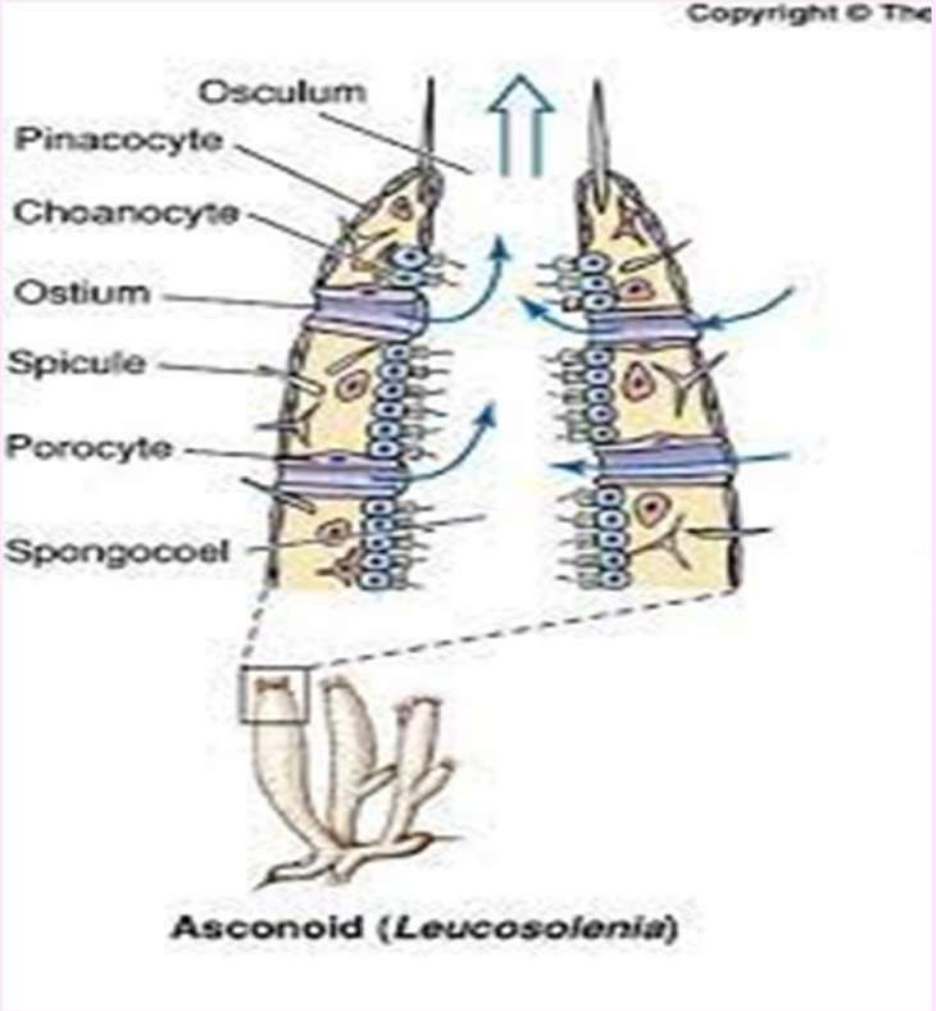
a) Asconoid

b) Syconoid

c) Leuconoid

Asconoid Canal System

- This type of canal system occurs in only a very few sponges like Leucosolenia which are small in size having vase like radially symmetrical body.
- It is a simplest type of canal system



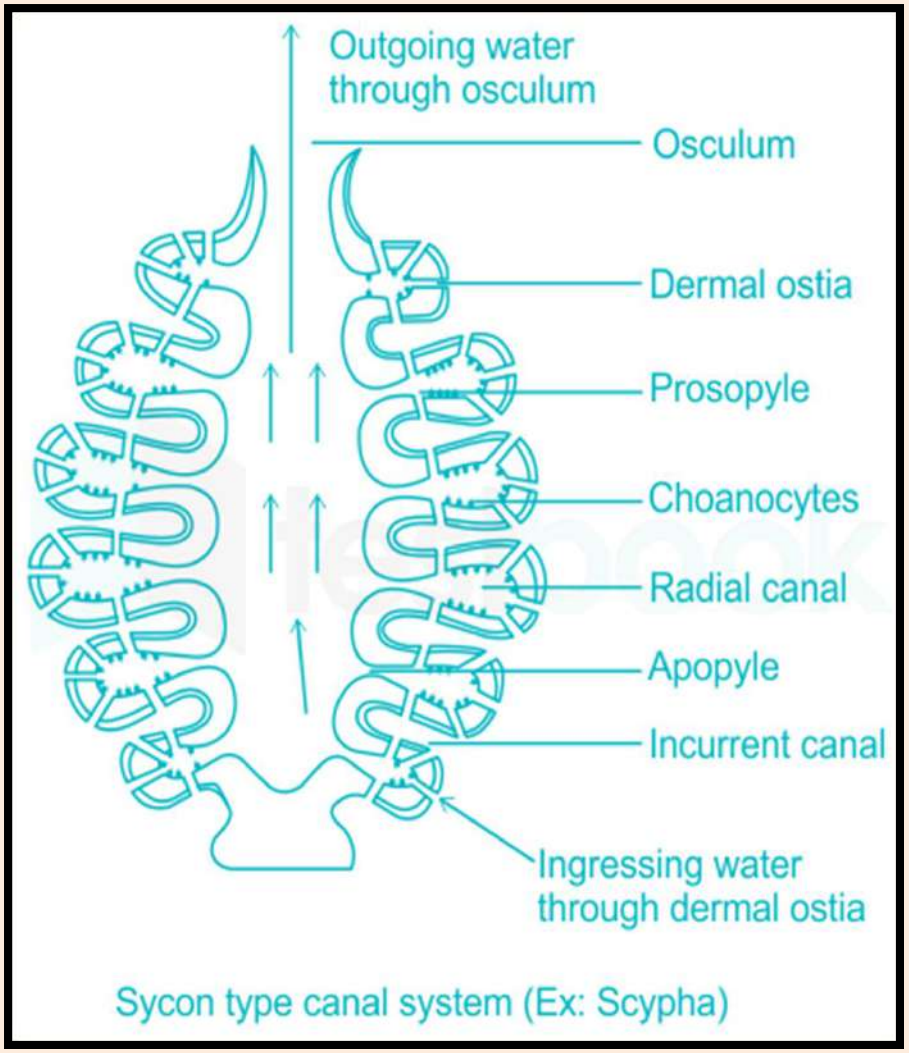
Asconoid Canal System

Salient Features:

- ✓ ***The body wall is thin walled and unfolded with poorly developed mesenchyme.***
- ✓ ***There are numerous intra cellular perforations in the body wall the ostia or incurrent pores which pass through porocytes into spongocoel.***
- ✓ ***The spongocoel which opens outside by single terminal osculum is lined all over by choanocytes.***
- ✓ ***The route followed by the water currents is ostia, spongocoel and osculum.***

Syconoid Canal System

- **This type of canal system is slightly complicated and advanced than asconoid one**



Sycon type canal system (Ex: Scypha)

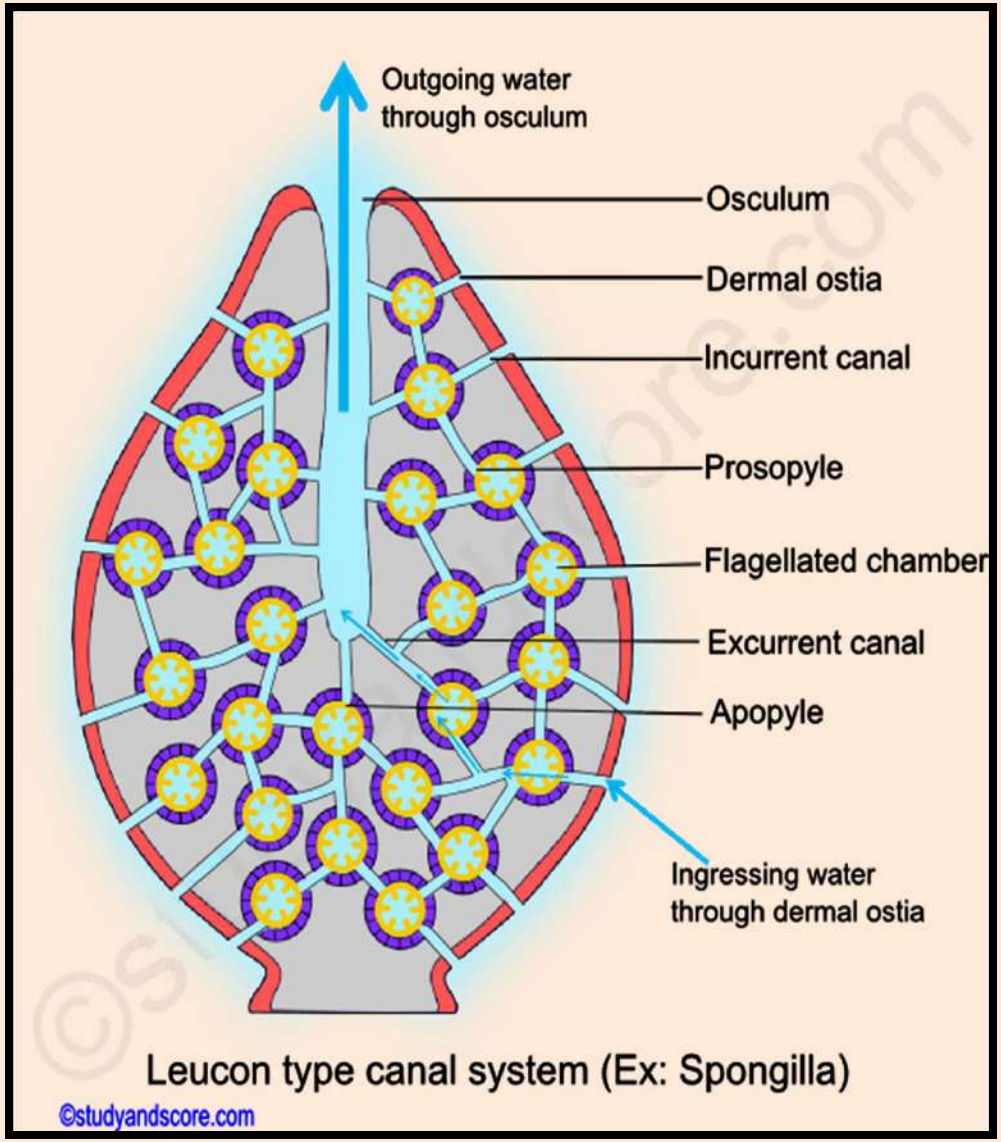
Syconoid Canal System

Salient Features:

- ✓ *The body wall of the sponge is thick and folded with well developed mesenchyme.*
- ✓ *The radial canals that are formed by out pushing of body wall are lined by choanocytes hence better called flagellated canals.*
- ✓ *The incurrent canals with epidermal lining formed between radial canals open to the exterior through dermal ostia and into the radial canals through prosopyles.*
- ✓ *The radial canals open into spongocoel by internal ostia.*
- ✓ *This type of canal system is found in Sycon, Sycetta, Grantia etc.*

Leuconoid Canal System:

- **It is the complex type of canal system which in calcarious sponges is attained through modification of asconoid and syconoid stages.**



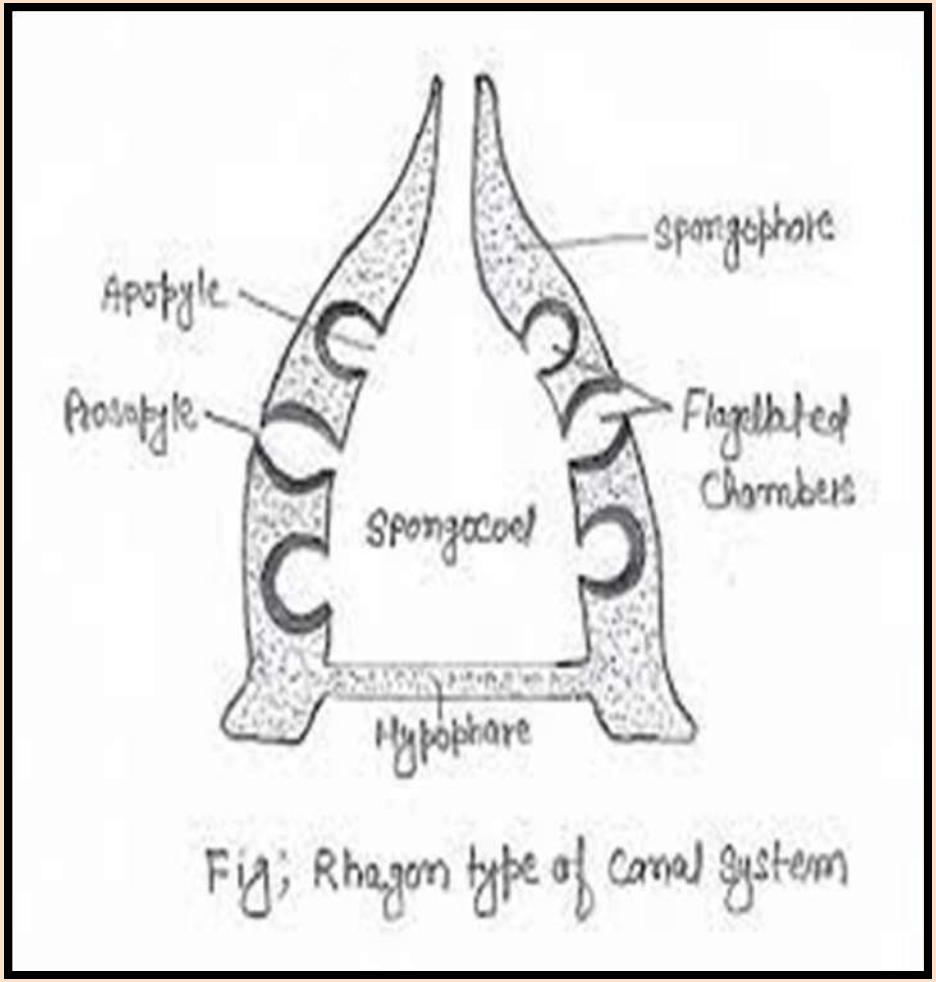
Leuconoid Canal System

Salient Features:

- ✓ **The mesenchyme forms extensive dermal and gastral cortex resulting thickening of sponge wall.**
- ✓ **The ostia lead into incurrent canals which are irregular and often branched.**
- ✓ **The spongocoel is either narrow or lacking.**
- ✓ **The radial canals are folded to form flagellated chambers.**
- ✓ **The flagellated chambers lead into excurrent canals that eitheropen into spongocoel or outside through osculum.**
- ✓ **There are four types of variations presented by leuconoid type of canal system viz. Eurypylous, Prosodal, Aphodal and Diplodal.**
- ✓ **This type of canal system is found in Leucilla,Geodia,Oscarella, Spongilla etc..**

Rhagon canal system

- In Demospongia leuconoid canal system is derived from a simple canal system found in Rhagon larva.
- So this type of canal system is called Rhagon canal system.



Fig; Rhagon type of canal system

Rhagon canal system

Salient Features:

- ✓ **The sponge body is conical in shape with basal wall the hypophere devoid of flagellated chambers and upper wall the spongophare containing flagellated chambers.**
- ✓ **The thick mesenchyme is traversed by incurrent canals and subdermal spaces.**
- ✓ **The incurrent canals open into small flagellated chambers which inturn open into wide spongocoel through excurrent canals.The spongocoel opens outside through osculum.**

Functions of Canal system

- **Nutrition**
- **Respiration**
- **Excretion**
- **Reproduction** *etc*..


Thank You